KOHLER GENERATORS

TT-520
INSTRUCTIONS
5/88

Overvoltage Shutdown Kits PA-291746 and 239682 Used with all Microcomputer Controllers Standby Generator Sets

These kits are designed to trigger the Emergency Stop circuit on Decision Maker and Decision Maker II (Dec-II) controllers or the Auxiliary Shutdown circuit on Dec-3 controllers in the event of sustained generator overvoltage. It is intended for use with all microcomputer controllers (Decision Maker, Decision Maker II [Dec-II], and Dec-3) used on Fast Response, Fast Response II (FR-II), TR-Series, and TR-II Series generator sets. It is not compatible with relay logic controllers. Read these instructions completely before installing the kit.

⚠ WARNING

UNIT STARTS WITHOUT NOTICE! Units with Automatic Transfer Switches start automatically. Potential injury or electrocution can result. Turn Generator Master Switch on controller to OFF position, and remove battery cables (remove negative lead first and reconnect is last) to disable generator set before working on any equipment connected to generator.

⚠ WARNING

HIGH VOLTAGE! Disconnect set from load by opening line circuit breaker, or by disconnecting generator output leads from transfer switch and heavily taping ends of leads. The GENERATOR SAFEGUARD BREAKER MUST NOT BE USED IN PLACE OF LINE CIRCUIT BREAKER! If high voltage is transferred to load during test, personal injury and equipment damage may result.

⚠ WARNING

DANGER OF ELECTROCUTION! The calibration procedure requires that the generator set be running when adjustments are made. Controller meters are at LINE VOLTAGE! Avoid contacting electrical connections with adjustment tool. Remove wristwatch, rings, and jewelry that can cause short circuits. Do not touch electrical equipment when standing in water, on wet ground, or when your hands are wet.

CAUTION

EQUIPMENT DAMAGE! This kit must be installed by a qualified generator set technician or certified electrician.

NOTE

Overvoltage shutdown kit 239682 MUST be used as a service replacement for Fast Response (FR-I) generator sets.

INSTALLATION

1. Place controller Master switch to OFF/RESET position. Disconnect generator set battery, negative lead first. Remove controller cover.
2. Clip R-2 from overvoltage shutdown board if installing on generator set with 24-Volt cranking. See Figure 1.

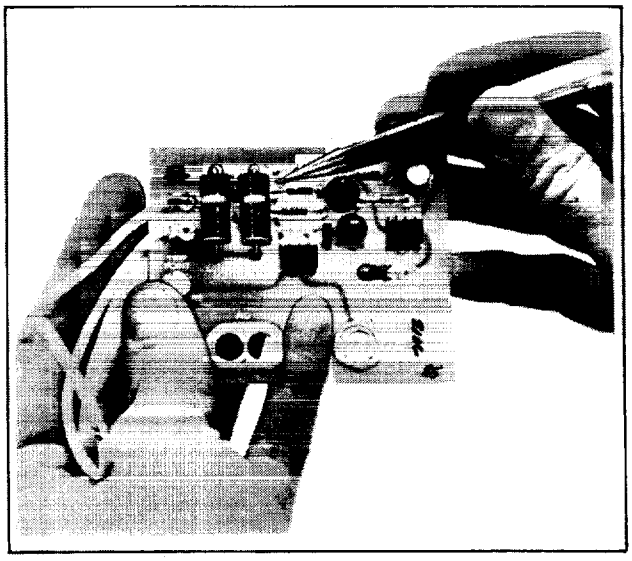


Figure 1. Overvoltage Shutdown Board

3. Remove AC interlock board from rear of frequency meter located in controller upper cabinet. See Figure 2.
4. Install frequency meter connections, overvoltage shutdown board, and AC interlock board as shown in Figure 3.

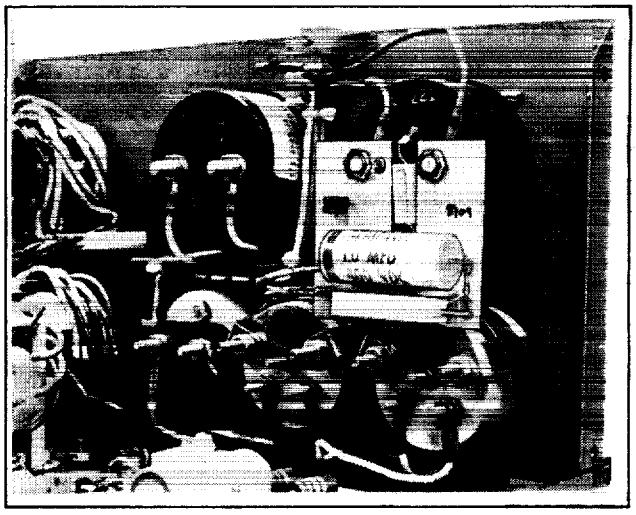
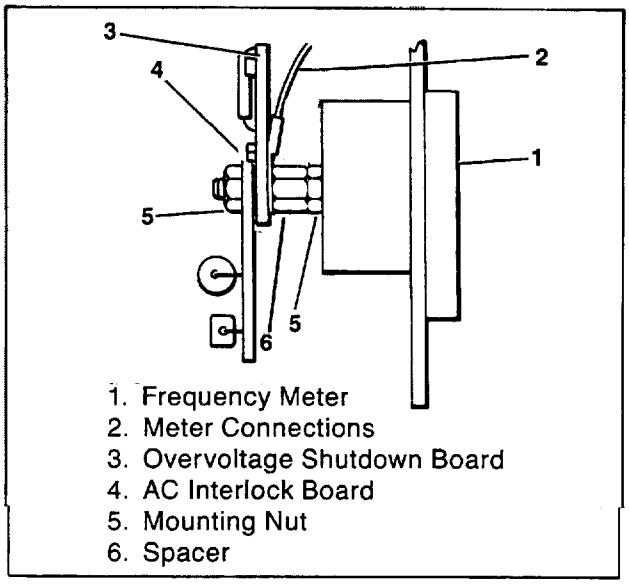


Figure 2. AC Interlock Board



1. Frequency Meter
2. Meter Connections
3. Overvoltage Shutdown Board
4. AC Interlock Board
5. Mounting Nut
6. Spacer

Figure 3. Circuit Board Mounting

5. Connect lead 2 from overvoltage protection board to grounded terminal of AC ammeter. Connect lead 70 to (I) terminal of water temperature gauge. Connect lead 30 from harness to Pin 30 of overvoltage protection board. See Figure 4.

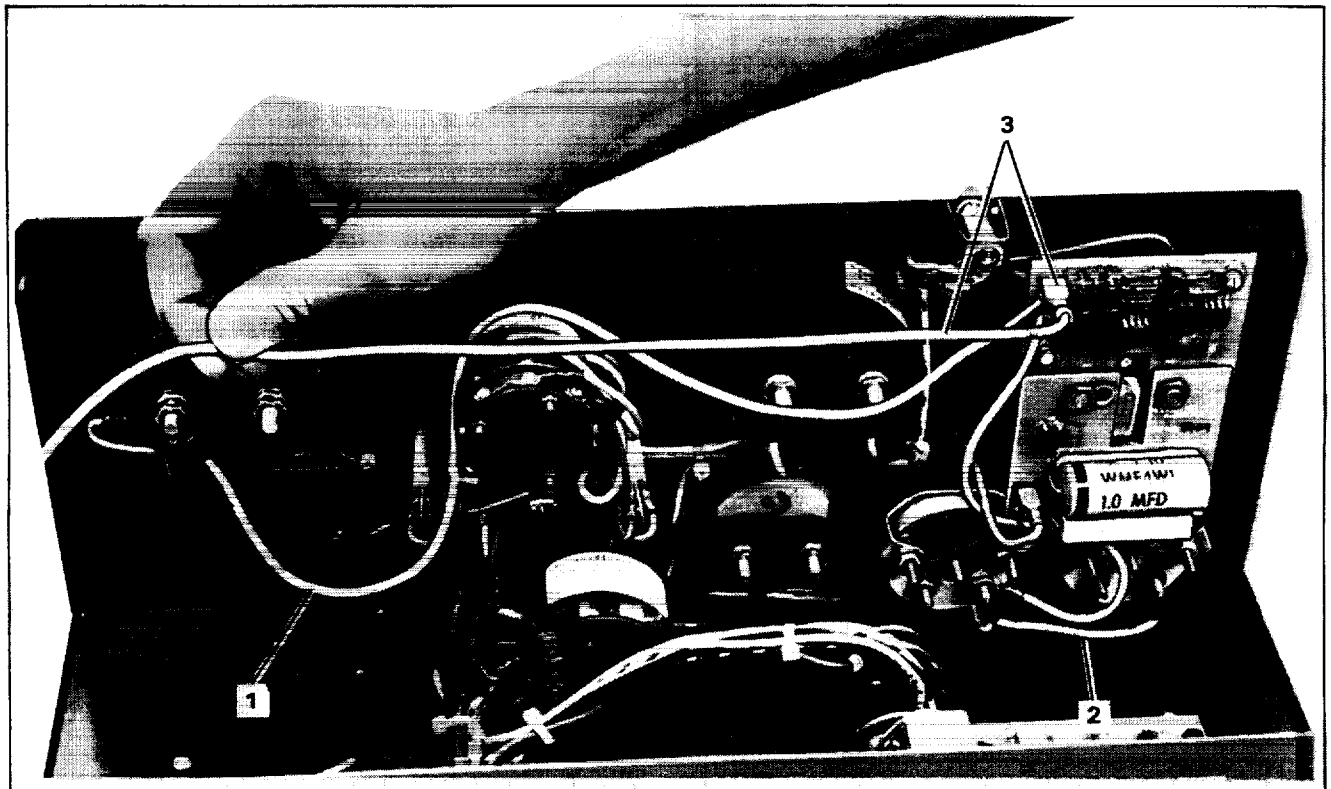
NOTE

Lead 30 can be found behind DC voltmeter, wrapped with the other leads and with the end taped.

6. Voltage Calibration

Overvoltage Shutdown Kit PA-291746 (Circuit Board F-291739).

Remove jumper wire J1 from circuit board, if generator is connected for any voltage, EXCEPT for 139/240 Volts, 3-Phase, 4-Wire, 60 Hz. low wye or 277/480 Volts, 3-Phase, 4-Wire, 60 Hz. high wye. For these voltages, leave jumper wire J1 connected.



1. Lead 2 2. Lead 70 3. Lead/Pin 30

Figure 4. Overvoltage Shutdown Board Connections

NOTE

If kit was installed on a Decision Maker II (Dec-II) or Dec-3 controller, installation is complete after Step 6. Go to TESTING procedure following.

Overvoltage Shutdown Kit 239682 (Circuit Board A-291659)

Circuit board is factory preset for all voltages, EXCEPT for 139/240 Volts, 3-Phase, 4-Wire, 60 Hz. low wye or 277/480 Volts, 3-Phase, 4-Wire, 60 Hz. high wye. For these voltages, use the following adjustment procedure. For ALL voltages, leave jumper wire J1 connected.

a. Disconnect generator from load. Connect digital AC voltmeter (or other highly accurate voltmeter) to terminals V0 and V7 on controller terminal block. Reconnect battery, negative lead last.

⚠ WARNING

HIGH VOLTAGE! Disconnect set from load by opening line circuit breaker, or by disconnecting generator output leads from transfer switch and heavily taping ends of leads. The GENERATOR SAFEGUARD BREAKER MUST NOT BE USED IN PLACE OF LINE CIRCUIT BREAKER! If high voltage is transferred to load during test, personal injury and equipment damage may result.

Start generator set by placing MASTER switch to TEST position on Decision Maker and Decision Maker II (Dec-II) controllers or to RUN position on Dec-3 controllers.

b. Insulate shaft of insulated-handle screwdriver by wrapping with electrical tape.

⚠ WARNING

DANGER OF ELECTROCUTION! The calibration procedure requires that the generator set be running when adjustments are made. Controller meters are at LINE VOLTAGE! Avoid contacting electrical connections with adjustment tool. Remove wristwatch, rings, and jewelry that can cause short circuits. Do not touch electrical equipment when standing in water, on wet ground, or when your hands are wet.

Use screwdriver to turn overvoltage shutdown board adjustment pot. (R16) fully counterclockwise.

c. Loosen locknut (if equipped) and turn voltage adjustment rheostat on controller to indicate a reading of 165 Volts on digital AC voltmeter.

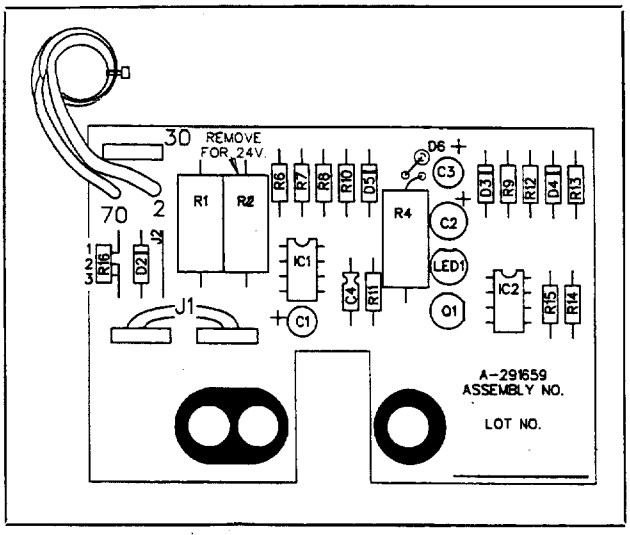


Figure 5. Overvoltage Shutdown Board Adjustment Pot.

d. Use screwdriver to slowly turn overvoltage shutdown board adjustment pot. (R16) clockwise until red L.E.D. on overvoltage board turns off. Generator set will shutdown approx. 2 seconds after L.E.D. goes off. See Figure 5.

e. Turn voltage adjustment rheostat counterclockwise to reduce voltage. Restart generator set.

NOTE

To restart generator set, place generator switch to center OFF position and press RESET button on Decision Maker controller or to OFF/RESET position on Decision Maker II (Dec-II) and Dec-3 controllers. Place generator switch to TEST position on Decision Maker and Decision Maker II (Dec-II) controllers or to RUN position on Dec-3 controllers to start generator set.

f. Slowly turn voltage adjustment rheostat clockwise while observing AC voltmeter. Red L.E.D. should turn off at 165 Volts +/−5 Volts and generator set will shutdown approx. 2 seconds later. If shutdown voltage is NOT within tolerance, repeat procedure; otherwise, continue to Step g.

g. Turn voltage adjustment rheostat counterclockwise to reduce voltage. Restart generator.

h. Turn voltage adjustment rheostat as necessary for controller AC voltmeter to indicate proper voltage for phase indicated by selector switch. STOP generator set.

i. Tighten lock nut (if equipped) on voltage adjustment rheostat. Use RTV sealant or equivalent to seal position of overvoltage shutdown board adjustment pot. (R16). Disconnect digital AC voltmeter.

NOTE

If kit was installed on a Decision Maker II (Dec-II) or Dec-3 controller, installation is complete after Step 6. Go to TESTING procedure following.

Decision Maker I controller only

7. Disconnect battery, negative lead first. Push pin socket end of lead 30 into rear of P5 socket, position B. See Figure 6. Tie lead 30 to existing harness.

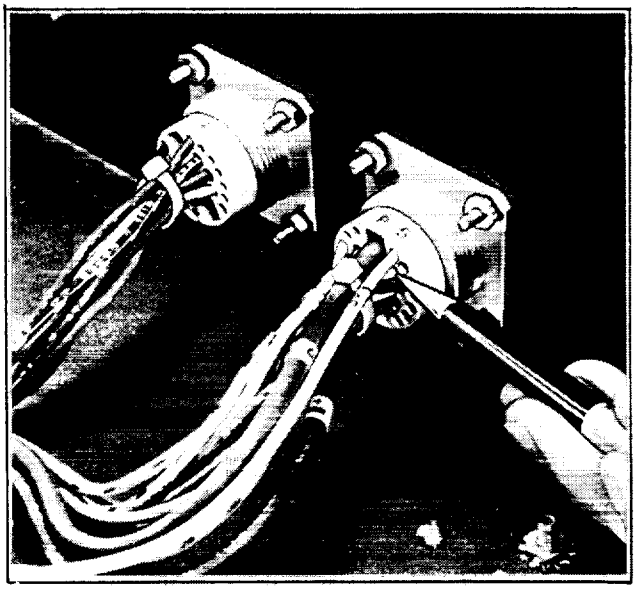


Figure 6. Socket, Pin Position

NOTE

Interconnection wire harness (to P2 and P5 connectors) may already contain leads to Emergency Stop circuit. Check P5 plug for pin at position B (Figure 7). If pin is present, wiring is complete, go to TESTING procedure following. Otherwise, continue to Step 8.

8. Open P5 plug harness clamp and push pin of supplied 26 in. (66 cm) lead 30 into rear of P5 plug at position B (Figure 7). Close P5 plug harness clamp.

9. Run supplied lead 30 through harness to P2 plug. Open P2 plug harness clamp and push pin into rear of P2 plug at position K (Figure 8). Close P2 plug harness clamp.

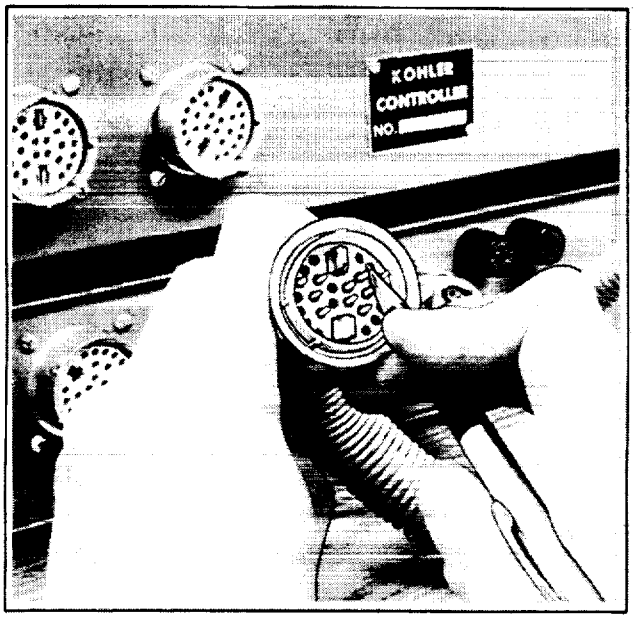


Figure 7. P5 Plug, Pin Position

10. Remove controller tray from lower cabinet. Push pin end of supplied 12 in. (30 cm) into rear of P2 socket at position K.

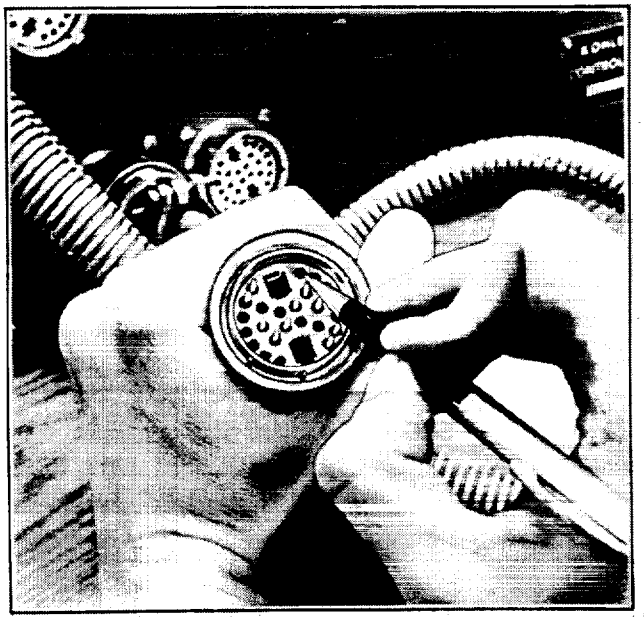


Figure 8. P2 Plug, Pin Position

11. Cut lead 30 connected to Emergency Stop switch 2 in. (51 mm) from switch and strip ends ¼ in. (6 mm). See Figure 9. Use an insulink to connect both leads 30 to existing lead at Emergency Stop switch. Use ohmmmeter to check for continuity from terminal 30 of overvoltage shut down board to lead 30 terminal at Emergency Stop switch.
12. Reinstall controller tray in lower cabinet.
13. Perform TESTING procedure following.

TESTING

1. Disconnect generator from load (if not already done). Reconnect battery, negative lead last (if not already done).

⚠WARNING

HIGH VOLTAGE! Disconnect set from load by opening line circuit breaker, or by disconnecting generator output leads from transfer switch and heavily taping ends of leads. The GENERATOR SAFEGUARD BREAKER MUST NOT BE USED IN PLACE OF LINE CIRCUIT BREAKER! If high voltage is transferred to load during test, personal injury and equipment damage may result.

Place generator switch to TEST position on Decision Maker and Decision Maker (Dec-II) controllers and to RUN position on Dec-3 controllers to start generator set.

2. Loosen locknut (if equipped) and turn voltage adjustment rheostat on controller slowly clockwise until generator set shuts down and Emergency Stop lamp lights on Decision Maker and Decision Maker II (Dec-II) controllers or the Auxiliary Shutdown lamp lights on Dec-3 controllers. If generator set shuts down, go to Step 3.

NOTE

If generator set does not shutdown, stop generator set using Master Switch. Recheck connections of overvoltage kit. Retest shutdown function.

If shutdown still does not occur, STOP generator set using Master Switch, use the following voltage check procedure to determine fault.

a. With generator set stopped, disconnect lead 30 at overvoltage shutdown board. Connect DC voltmeter (10 Volt scale or higher) positive (+) test lead to terminal 30 on overvoltage shutdown board and negative (−) test lead to controller ground lug. See Figure 10.
b. Start generator set. Turn voltage adjustment rheostat to a overvoltage condition and observe voltmeter reading.

   A reading of less than 5 Volts indicates the overvoltage board is defective.

   A reading of 5 Volts or higher indicates the controller board is defective.

NOTE

Some Dec-3 controller circuit boards may not be compatible with the overvoltage shutdown kit. If this circumstance exists, contact Kohler Co., Generator Division, Service Dept.

c. STOP generator set. Disconnect DC voltmeter. Replace defective component. Reconnect lead 30 to overvoltage shutdown board. Repeat TESTING procedure.

3. Turn voltage adjustment rheostat on controller slightly counterclockwise. Place generator switch to center OFF position and press RESET

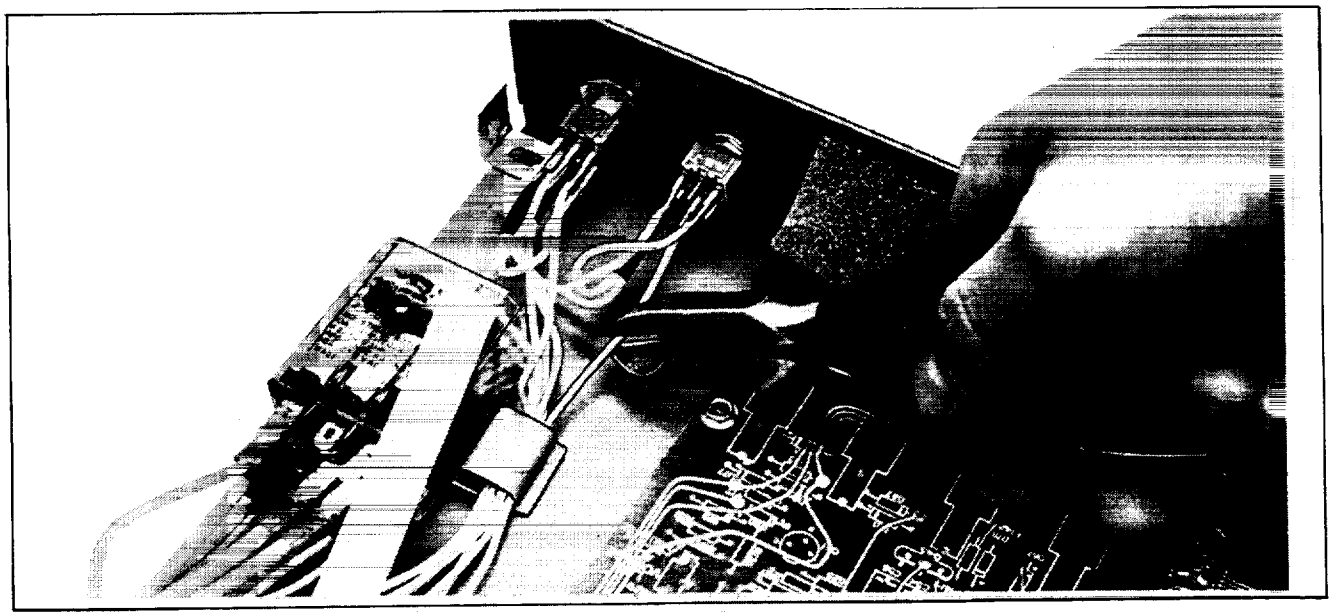


Figure 9. Cutting Lead 30

button on Decision Maker controller or to OFF/ RESET position on Decision Maker II (Dec-II) and Dec-3 controllers.

4. Place generator switch to TEST/RUN position to start generator set. Turn voltage adjustment rheostat as necessary for AC voltmeter to read proper voltage for phase indicated by selector switch. Retighten locknut (if equipped) on voltage adjustment rheostat to hold setting. STOP generator set. Reinstall controller cover.
5. Disconnect battery, negative lead first. Reconnect generator to load.
6. Reconnect battery, negative lead last.

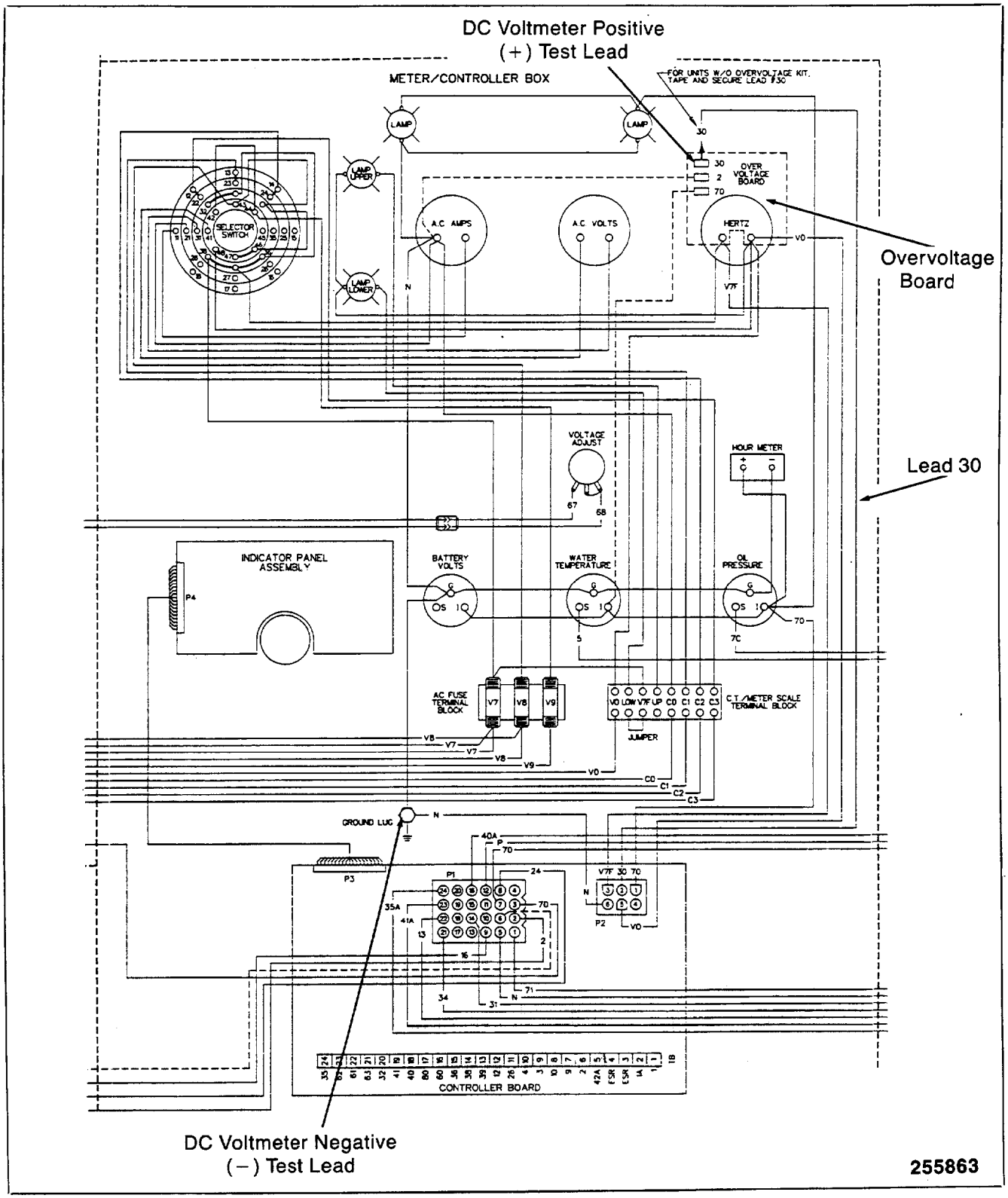


Figure 10. DC Voltmeter Test Conditions